

## DIGITALLY-REALIZED SIGNAL GENERATORS AND METHODS

### ABSTRACT OF THE DISCLOSURE

Signal generators are realized with combinations of a digital synthesizer (e.g., direct digital synthesizer), a frequency controller and  
5 a phase controller. The frequency controller receives a user-provided minimum count of a reference frequency wherein the minimum count is chosen to initially position a synthesizer signal within a selected frequency error of the reference frequency. In response, the frequency controller runs counters over a time sufficient to obtain the minimum  
10 count. The frequency controller then uses a difference count between the counts of the reference frequency and the synthesizer frequency to determine a controlled tuning word that properly positions the synthesizer signal. Subsequently, the phase controller detects phase differences between the reference signal and the synthesizer signal  
15 and applies phase correction signals to control the phase of the synthesizer signal.